

ture of the Glass. And if you add the brighter half of the Red, (that half which is next the Orange, and the brighter half of the Green, (that half which is next the Yellow,) about three fifth parts of the Light of these two Colours will fall within the same Circle, and two fifth parts will fall without it round about; and that which falls without will be spread through almost as much more space as that which falls within, and so in the gross be almost three times rarer. Of the other half of the Red and Green, (that is of the deep dark Red and Willow Green) about one quarter will fall within this Circle, and three quarters without, and that which falls without will be spread through about four or five times more space than that which fall within; and so in the gross be rarer, and if compared with the whole Light within it, will be about 25 times rarer than all that taken in the gross; or rather more than 30 or 40 times rarer, because the deep red in the end of the Spectrum of Colours made by a Prism is very thin and rare, and the Willow Green is something rarer than the Orange and Yellow. The Light of these Colours therefore bring so very much rarer than that within the Circle, will scarce affect the Sense especially since the deep Red and Willow Green of this Light, are much darker Colours than the rest. And for the same reason the Blue and Violet being much darker Colours than these, and much more rarified, may be neglected. For the dense and bright Light of the Circle, will obscure the rare and weak Light of these dark Colours round about it, and render them almost insensible. The sensible Image of a lucid point is therefore scarce broader than a Circle whose Diameter is the 250th part of the diameter of the aperture of the Object Glass of a good Telescope, or not much broader, if you except a faint and dark misty light round about it, which a Spectator will scarce regard. And therefore in a Telescope  
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whose aperture is four Inches, and length an hundred Feet, it exceeds not 2" 45", or 3". And in a Telescope whose aperture is two Inches, and length 20 or 30 Feet, it may be 5" or 6" and scarce above. And this Answers well to Experience: For some Astronomers have found the Diameters of the fixt Stars, in Telescopes of between twenty and sixty Feet in length, to be about 4" or 5" or at most 6" in Diameter. But if the Eye-Glass be tinged faintly with the smoke of a Lamp or Torch, to obscure the Light of the Star, the fainter Light in the circumference of the Star ceases to be visible, and the Star (if the Glass be sufficiently soiled with smoke) appears something more like a Mathematical Point. And for the same reason, the enormous part of the Light in the Circumference of every lucid Point ought to be less discernable in shorter Telescopes than in longer, because the shorter transmit less Light to the Eye.

Now if we suppose the sensible Image of a lucid point, to be even 250 times narrower than the aperture of the Glass: yet were it not for the different refrangibility of the Rays, its breadth in an 100 Foot Telescope whose aperture is 4 Inches would be but  $\frac{31}{3600000}$  parts of an Inch, as is manifest by the foregoing Computation. And therefore in this Case the greatest Errors arising from the spherical Figure of the Glass, would be to the greatest sensible Errors arising from the different refrangibility of the Rays as  $\frac{31}{3600000}$  to  $\frac{4}{250}$  at most, that is only as 1 to 1826. And this sufficiently shews that it is not the spherical Figures of Glasses but the different refrangibility of the Rays which hinders the perfection of Telescopes.

There is another Argument by which it may appear that the different refrangibility of Rays, is the true Cause of the imperfection of Telescopes. For the Errors of the Rays arising from the spherical Figures of Object-Glasses, are as

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